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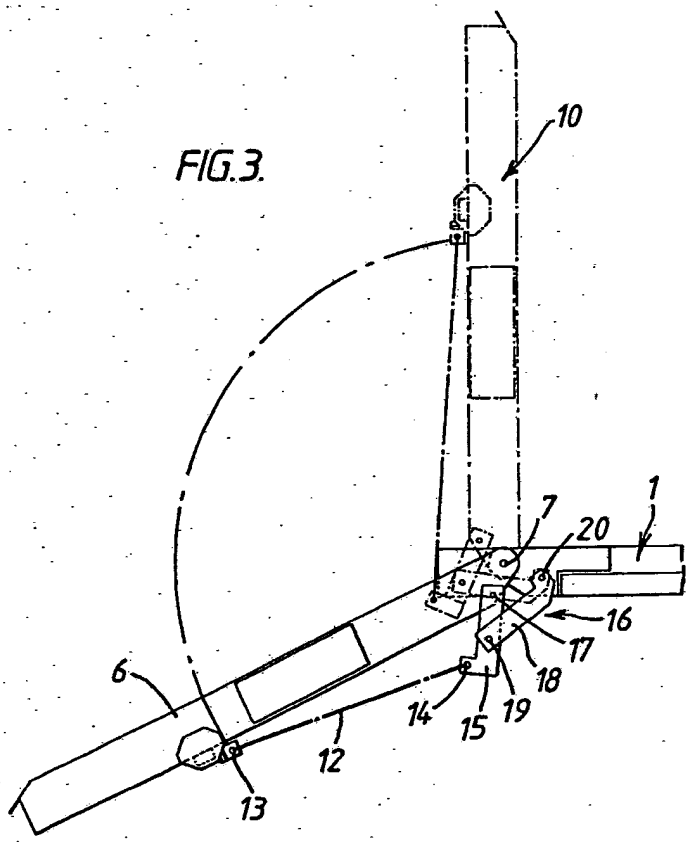
(54) A conveyor system

(57) A telescopic boom conveyor includes an elongate main conveyor 1 with a cantilevered conveyor section 6 extending from the end thereof, the conveyor section being pivotally connected to the main conveyor so as to be pivotable about a horizontal axis 7 to enable the section to be inclined relative to the main conveyor, the system including means to pivot the cantilevered conveyor section from a working position to a stored position, in which it is preferably vertical. The means to pivot the cantilevered conveyor section preferably comprises a hydraulic ram and cylinder device 12 operatively connected to a lever arrangement 16 secured to the conveyor section 6.

FIG.3.



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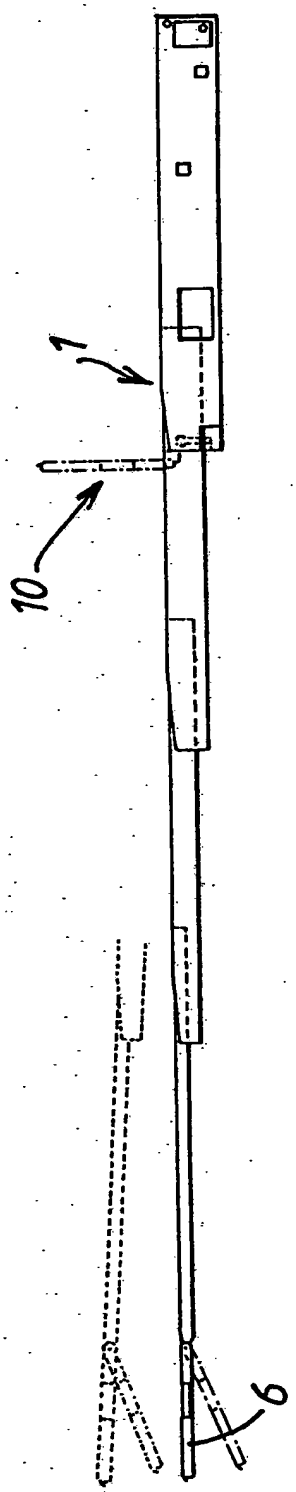


FIG.1.

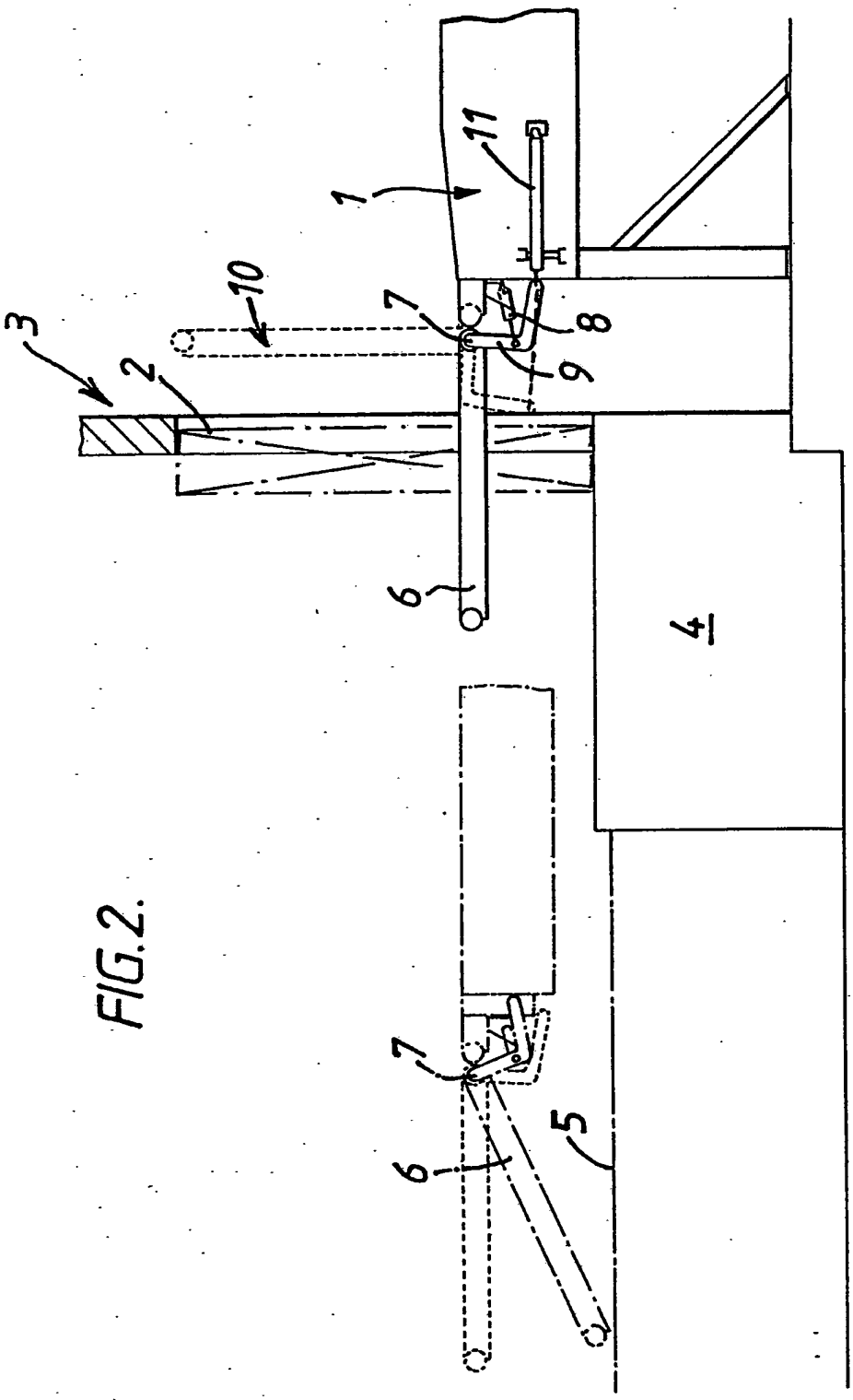
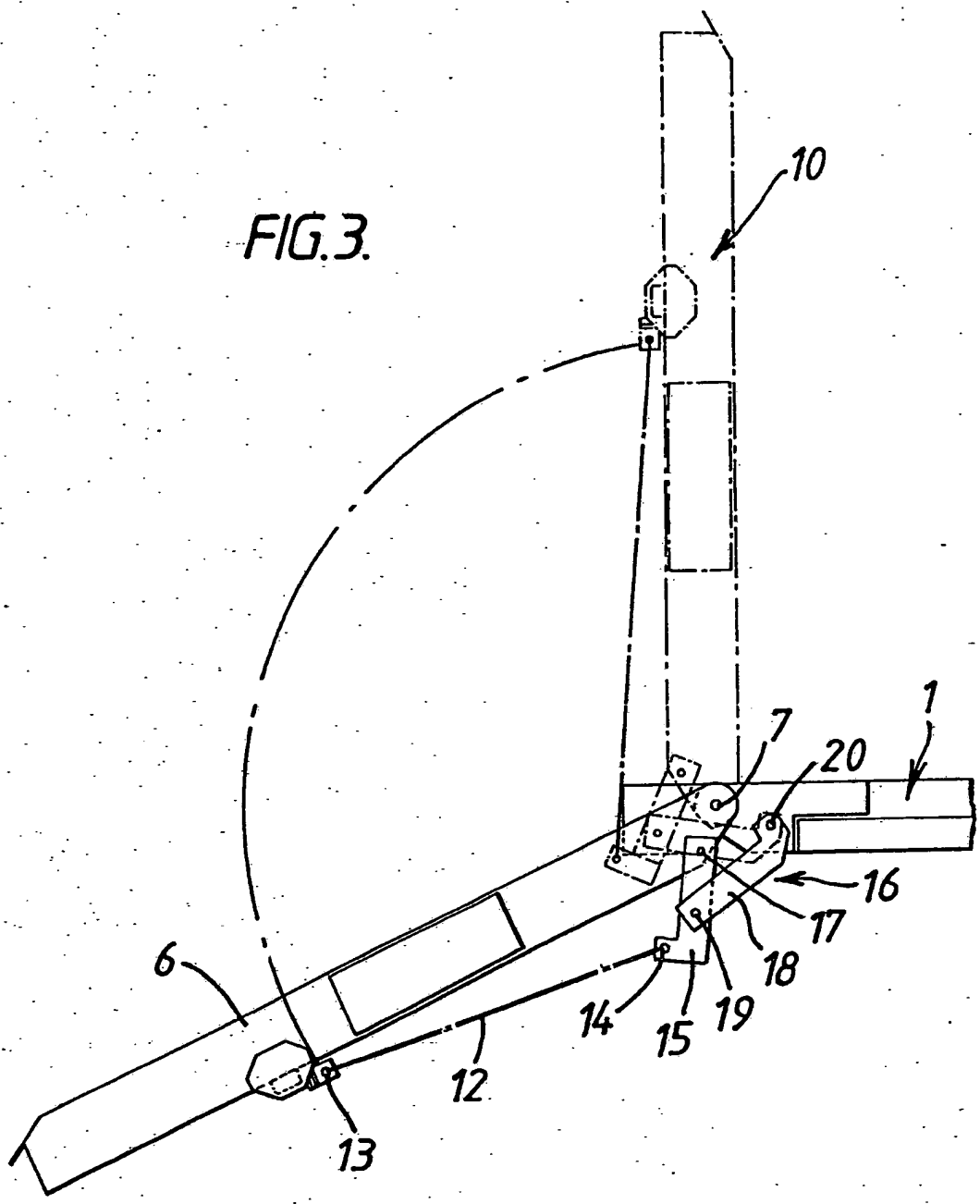


FIG.2.

FIG.3.



A Conveyor System

This invention relates to a conveyor system and, particularly but not exclusively, to a telescopic boom conveyor.

One application for boom conveyors is the loading and unloading of vehicles at a loading bay of a factory or warehouse. The conveyor has a load supporting belt on which items to be loaded are placed and the conveyor is arranged so that when it is extended it projects into the vehicle to be loaded. It is known to mount such a belt conveyor on a base unit so that it is capable of being raised and lowered and moved from side to side, within predetermined limits, to transfer the loads to the point in the vehicle where discharge is required. For this purpose it is known to have a short conveyor section cantilevered from the end of the main conveyor.

The present invention seeks to provide an improved conveyor system having a cantilevered conveyor section in which the section is movable to a stored position.

According to the present invention there is provided a conveyor system including an elongate main conveyor with a cantilevered conveyor section extending from the end thereof, the cantilevered conveyor section being pivotally connected to the main conveyor so as to be pivotable about a horizontal axis to enable the section to be inclined relative to the main conveyor, the system including means to pivot the cantilevered conveyor section from a working position to a stored position.

Preferably, when in the stored position, the conveyor section is substantially vertically disposed. The means to pivot the cantilevered conveyor section to the stored position may comprise a hydraulic ram and cylinder device which is mounted so as to pivot the cantilevered conveyor section to the vertical position when the conveyor is in a retracted condition. In an alternative embodiment, when

the conveyor system comprises a telescopic boom conveyor, the cantilevered conveyor section is automatically moved to the store position by stop means when the conveyor is retracted. This may be achieved by a mechanical stop or cam arrangement or by the energisation of a solenoid.

Two embodiments of the present invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows a schematic side view of a conveyor adapted to be located at a warehouse loading bay,

Figure 2 shows a view of the conveyor in the retracted position, and

Figure 3 shows a side view of a second embodiment.

The conveyor system shown generally at 1 comprises a telescopic boom conveyor movable from a fully retracted position, as shown on the right of Figure 2 where it is located inside the loading door 2 of a warehouse 3. The conveyor 1 is a telescopic boom conveyor and is extendible out of the warehouse door 2 to project to the position shown on the left hand side of drawing in which it projects into the interior of a semi-trailer backed up to a dock 4. The internal floor of the trailer is indicated by reference number 5. The conveyor has a cantilevered conveyor section 6 extending from its outermost end, the cantilevered section being pivotally mounted to the end of the conveyor so as to pivot about a horizontal axis 7. The conveyor section 6 is thus capable of being inclined relative to the main conveyor 1 as indicated on the left hand side of the drawing. The inclination of the conveyor section is controlled by a hydraulic ram 8 powered by an electrically driven power pack mounted on the conveyor. The hydraulic ram 8 is operatively connected to a lever 9 secured rigidly to the conveyor section and extending approximately 90° to the length thereof. The ram 8 is fixed in position relative to the conveyor 1 by its cylinder and the ram is operatively engaged with the lever 9 through a roller which

abuts the lever 9 and thereby accommodates the relative movement occurring between the ram and cylinder device 8 and the lever 9 caused by the pivotal motion. In practice, a ram device 8 and lever 9 will be located on each side of the conveyor section 6.

The cantilevered conveyor section is pivotable to a stored position, shown in outline with reference 10, in which the section is substantially vertically disposed. In this way, the conveyor 6 can be retracted to lie within the warehouse without necessitating the provision of extra floor space in the warehouse. Pivoting of the conveyor 6 to the stored, vertical position may be carried out automatically or selectively. In the embodiment shown in Figure 2 of the drawing, a further ram and cylinder device 11 is mounted either on the free end of the conveyor 1 or is mounted in the warehouse adjacent the position occupied by the free end of the conveyor 1 when the conveyor is full retracted.

In operation, the ram 11, when extended, engages with a limb 12 extending from the arm 9 secured to the conveyor section 6. Extension of the ram 11 pivots the arm 9, and hence the conveyor section 6 to the position shown in outline on the right hand side of the drawing. It is also envisaged that the installation may alternatively incorporate a cam or ramp engageable by the limb 9 when the conveyor is retracted to automatically pivot the conveyor section to the vertical position shown. This ramp would be placed along the side of conveyor, mounted on the warehouse floor or the supporting framework or base of the main conveyor 1 so as to be engaged by the arms 9. Other methods of raising the conveyor section 6 may be used, such as solenoid control devices operated by stops on the conveyor section as the section is retracted. Although the stored position shown is essentially vertical, the stored position may be selected to that desired in the particular installation.

A second embodiment of the invention will now be described with reference to Figure 3 of the drawings, which shows, in side view, a cantilevered conveyor section 6 pivotable about the horizontal axis 7, as in the previous embodiment. The section 6 is pivoted by a hydraulic ram and cylinder device 12, not shown in detail, extending between a pivotal connection 13 intermediate the length of the section 6 and a pivotal connection 14 on one end of a first link 15 of a linkage arrangement 16.

The first link 15 is pivotally connected at its other end to a pivot axis 17 on the conveyor section 6 spaced from but parallel to the horizontal axis 7. A second link 18 of the linkage arrangement is pivotally connected at one of its ends to a pivot point 19 on the first link 15 intermediate its length and at its other end to a pivot point 20 on the front of the main conveyor 1.

The distances between the pivot points 7, 17, 14, 19 and 20 and their relative spatial relationship is arranged so that for a given increment of extension of the ram device 12, the pivotal movement of the conveyor section 6 is much smaller in the range of its movement from the horizontal to the lowered position than in the range of movement from the horizontal to the vertical stored position. By this arrangement, a more accurate control of the conveyor section position is obtained in the operating range of the section, that is, between the horizontal and the downwardly pointing position, but as the section is retracted it moves faster to reach the stored position more quickly.

Although only one linkage arrangement is shown, in practice identical linkages and ram devices are provided on both sides of the conveyor to prevent twisting moments being applied to the conveyor.

CLAIMS:

1. A conveyor system including an elongate main conveyor, a cantilevered conveyor section extending from the end of the main conveyor, a pivotal connection connecting the cantilevered conveyor section to the main conveyor so that the conveyor section is pivotable about a horizontal axis to enable the section to be inclined relative to the main conveyor, the system including means to pivot the cantilevered conveyor section from a working position to a stored position.

2. A conveyor system according to claim 1, wherein the conveyor section when in the stored position is substantially vertically disposed.

3. A conveyor system according to claim 1 or 2 wherein, the conveyor system comprises a telescopic boom conveyor.

4. A conveyor system according to claim 1, wherein the means to pivot the cantilevered conveyor section to the stored position comprises a hydraulic ram and cylinder device which is mounted so as to pivot the cantilevered conveyor section to the stored position when the conveyor is in a retracted condition.

5. A conveyor system according to claim 1, wherein the cantilevered conveyor section is moved to the stored position by stop means when the conveyor is retracted.

6. A conveyor system according to claim 5, wherein the movement of the cantilevered conveyor section is achieved by a ramp or a solenoid control device.

7. A conveyor system according to claim 4, wherein the means to pivot the cantilevered conveyor section to the

stored position further comprises a lever arrangement secured to the cantilevered conveyor section, the ram and cylinder device being operatively connected to the lever arrangement.

8. A conveyor system according to claim 7, wherein the lever arrangement comprises a first link pivotally connected at one end to the conveyor section at a point adjacent to but spaced from the pivotal connection between the conveyor section and the main conveyor, the ram and cylinder device extending between the other end of the first link and a point on the conveyor section intermediate the length thereof, and a second link pivotally connected at one end to a point on the first link intermediate the length thereof and at its other end to the main conveyor at a point spaced from the said pivotal connection between the conveyor section and the main conveyor.

9. A conveyor system according to claim 7, wherein the ram is fixed in position relative to the main conveyor by its cylinder and the ram is operatively engaged with the lever arrangement through a roller which abuts the lever and thereby accommodates relative movement occurring between the ram and cylinder device and the lever arrangement caused by pivotal motion.

10. A conveyor system according to claim 7, 8 or 9, wherein a ram and cylinder device are located on each side of the cantilevered conveyor section.

11. A conveyor system as described herein with reference to and as illustrated in the drawings.

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